NASA SBIR/STTR Technologies

Fast Cure Repair Kit for Composites

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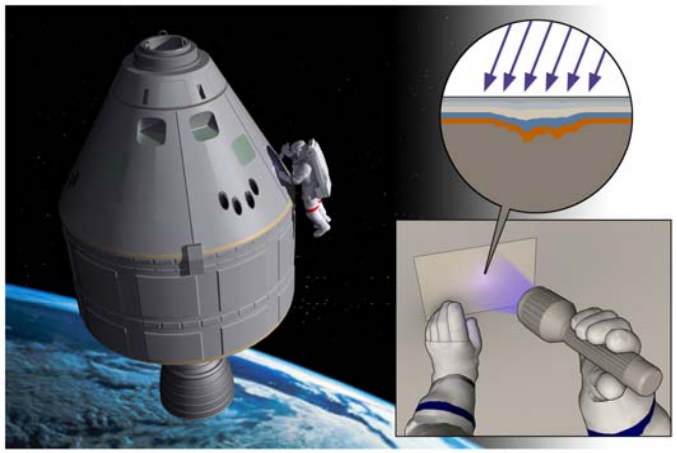
Proposal No.: X5.03-9269

Identification and Significance of Innovation

- High glass transition (Tg > 200ºC) composite matrix compatible resin.
- Composite reinforcement fabric patches preimpregnated with the formulated resin.
- Single LED battery operated light engine to cure the patch in less than a minute.

Expected TRL at beginning and end of contract: Beginning: 4 / End: 5



Technical Objectives and Work Plan

Objective 1. Formulate photochemistry for rapid UV cure resin that can be applied to NASA composite structures for rapid repair in space.

Objective 2. Demonstrate a single LED module that can provide sufficient UV and thermal (if necessary) energy to cure the suggested resin.

Objective 3. Develop the prepreg ply patches of reasonable tack viscosity.

The Work Plan consists of the following tasks:

Task 1. Assess NASA's Requirements for the C-kit

Task 2. Develop the Rapid Cure Photochemistry

Task 3. Optimize the LED UV Curing Module

Task 4. Prepare the Prepreg Patches

NASA Applications

Potential uses include repair of composite parts onboard spacecraft, such as the International Space Station, the Orion crew exploration vehicle and composite module fabricated at NESC, habitats under development, and rovers. Applications also include repairs of on-ground composite structures, such as liquid gases storage tanks, for example, as well as repairs of expensive bulky composite parts that are undergoing development and testing at NASA centers.

Non-NASA Applications

Examples of sectors that could benefit from fast, UV-curable adhesives technology include home repair, and the automotive, sporting goods, pipeline, marine, construction, and landscaping industries. The superior properties of the adhesives necessary for composite repairs extend the market to the level of heavy industries such as shipbuilding, new generations of aircraft, military truck production industry, heavy weaponry, and large-scale construction.

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NON-PROPRIETARY DATA